Part 1 — Introduction

1. This is the second report of the Committee on Common Standards for Electronic Parts. The first report, submitted in March, 1961, was not implemented, partly because the system of specifications recommended was not acceptable to all users, and partly because, at the time when the report was being considered, Industry, the Ministry of Aviation and the (then) Admiralty had all come to the conclusion that it would be advantageous for the Committee to review its proposals with the objectives of (a) examining, in the light of the growing emphasis on the reliability of electronics equipment, the feasibility of including information about reliability in specifications for parts; and (b) taking account of recent trends towards international standardization.

2. The Committee was accordingly re-convened in April, 1963, under the chairmanship of Rear Admiral G. F. Burghard, C.B., D.S.O.

Part 2 — Terms of Reference

3. The Committee agreed at its first meeting that its provisional Terms of Reference and membership should be widened to cover common standards not only for passive parts (e.g. resistors, capacitors), but active parts (valves and semi-conductors) also. The Committee's field of activity was thereby doubled, but there was general agreement that the opportunity should be taken to devise a system of standards and associated procedures common (so far as is practicable) to active and passive parts.

4. The Terms of Reference were then as follows:

To review the recommendations made in the Report dated 20th March, 1961, by the Working Party on Common Standards for Electronic Components and:

(1) to consider what form of specifications for electronic parts* could meet the requirements of Government Departments and the Capital Goods Industry:

- (a) if the requirements of other users were totally excluded;
- (b) without division into separate parts to reflect divergent standards;
- (c) in the light of international standardization:

(2) to consider whether Specification DEF.5011 alone would adequately define general environmental requirements without reference to BS.2011, and, if not, to consider what other specification would be adequate:

(3) to consider in the light of recent developments directed towards the improvement of the reliability of electronic parts:

- (a) whether it would be practicable to state reliability requirements in quantitative terms in common specifications, and, if so,
- (b) what changes in:
  - (i) the form of common specifications and
  - (ii) the associated administrative procedures recommended in the Working Party's Report dated 20th March, 1961,

  would be necessary to achieve this objective:

(4) to consider the extent to which common specifications as defined at (1) above could be applied, without any relaxation of their standards, to the requirements of other users (e.g. other public authorities and manufacturers of broadcast entertainment equipment):

(5) to report to the Permanent Secretary of the Ministry of Aviation by the 31st December, 1963.

5. The Committee regrets that the complexity of its task, and the difficulty of reconciling varying user requirements, made it impossible for it to submit its report by the target date—the end of 1963—which it had set itself.

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* Defined as 'parts appearing in circuit diagrams'.

Part 3 — The Committee's Approach

6. The Committee's approach has been twofold. Firstly, its objective has been to devise a unified system of national standards specifying technical characteristics and with provision for meeting different (major) user requirements (mainly by varying the provision for testing). Within this system, the Committee has endeavoured to bring the bulk of military and capital goods Industry requirements together in one general category of specifications, so as to make it possible for:

(i) the maximum economic benefits to be derived from more extensive mass production and testing to common standards;

(ii) reliability data to be obtained from standardized batch sampling with cumulative endurance testing based on this large-scale production.

7. The second basic objective reflects the Committee's conclusion that conventional technical specifications alone could not adequately ensure that present-day requirements for reliable electronic parts were met, and therefore that there was a need for a complementary system of common procedures embracing:

(a) approval of the part;

(b) recording of test results;

(c) inspection approval of parts manufacturers;

(d) inspection;

(e) release.

Part 4 — Membership

THE MAIN COMMITTEE

8. The Committee consisted of representatives of the following bodies:
British Standards Institution (BSI)
Electronic Engineering Association (EEA)
Electronic Valve and Semiconductor Manufacturers Association (VASCA)
Radio and Electronic Component Manufacturers Federation (RECMF)
General Post Office
Ministry of Defence (Navy Department)
Ministry of Aviation.
A list of members of the Committee is shown in Appendix I.

THE SUB-COMMITTEES

9. The Committee set up four sub-committees. Their Terms of Reference and membership are shown in Appendix II. The Reliability Sub-Committee in turn appointed a Working Party of representatives of Industry and the Royal Radar Establishment, Malvern, to deal with the more technical aspects of common standards. The Committee and the sub-committees have held a total of 65 meetings. The British Radio Equipment Manufacturers Association and the Telecommunication Engineering and Manufacturing Association, though not members of the Committee or its sub-committees, were consulted, informally, on those aspects of the Committee's work which concern them. Individual designers were also invited to comment, as users, on the system of specifications which the Committee has recommended. The Society of British Aerospace Companies has received, at its request, copies of the more important papers issued by the Committee.

Part 5 — Existing Systems of Specifications

VARYING USER REQUIREMENTS

10. The widely-differing environmental and circuit conditions in which electronic parts are used, and the lack of a uniform system of specifications, have resulted in a variety of specifications to which parts are purchased. These specifications range from manufacturers' data sheets to complex Government (DEF and CV) specifications. However, very few parts are made solely for military or other Government purposes. Frequently, parts bought to different specifications come off the same production line, and differ only in the amounts of testing to which they are subjected and/or their finish.

DEF AND CV SPECIFICATIONS

11. Unless suitable British Standards exist or are being prepared, the Government drafts its own military specifications for electronic parts. DEF specifications (for passive parts) are drafted by Joint Service standardization committees—with Industry's collaboration. The processes of consultation, drafting, ratification and publication are inevitably slow. CV specifications (for valves and semi-conductors), though accepted as Joint Service specifications, are prepared by individual Government Research and Development Establishments. This procedure is simpler and quicker.

BRITISH STANDARDS

12. BSI committees prepare British Standards for electronic parts. Government Departments collaborate with Industry on some of this work.

TRADE ASSOCIATION AND MANUFACTURERS' SPECIFICATIONS

13. In addition, Trade Associations occasionally prepare their own specifications (for ultimate submission to the BSI as a basis for British Standards), and many equipment manufacturers write their own special variants of DEF and CV specifications to meet industrial and Government requirements.

REQUIREMENTS MET BY DEF AND CV SPECIFICATIONS

14. The Committee has estimated that about 40% of military requirements (including proprietary equipment) and 10% of the capital goods Industry's requirements for electronic parts are at present met by DEF and CV specifications.

Part 6 — Quality and Reliability Assurances

THE NEED FOR RELIABILITY ASSURANCES

15. The increasing complexity of electronic equipment is giving rise to a growing demand for reliability assurances for military and industrial equipment. Equipment designers therefore need adequate information about the longevity and uniformity, (e.g. failure rates and parametric drifts) of electronic parts. What this requirement involves in terms of the testing of electronic parts is described in Appendix III.

RELIABILITY ASSURANCES IN EXISTING SPECIFICATIONS

16. In the main, the present DEF specifications for passive parts require endurance tests to be carried out only at the initial Qualification Approval stage and (normally) every three years thereafter for the purposes of 'Maintenance of Qualification Approval' (MQA). Specification DEF.5001C will include requirements for systematic quality tests. In the active parts field, CV specifications already make some provision for systematic reliability tests, including endurance.

VARYING USER REQUIREMENTS

17. The Committee recognizes that, whilst parts from the one production line may be suitable for a wide variety of applications, production testing (and hence the level of quality assurance) will vary with the users' requirements. In some cases testing will be limited in order to keep prices down, and in others intensified to provide reliability assurances.

18. The Committee has concluded (after consulting representative users) that, in general, the Services and the capital goods Industry require similar degrees of quality assurance. The consumer goods Industry requires rather less.

19 It is clear, however, that it would be impossible for one set of standard parts to cover all military and industrial requirements (even if the less stringent requirements of the consumer goods Industry were excluded), because some users (both military and industrial) need parts for use in extreme environmental conditions. Additional testing would be necessary to establish reliability at such stress levels, and it would not be reasonable to expect the cost of this testing to be shared by all users.

20. It would also be impracticable to cater for all possible combinations of environmental stress levels: the aim must therefore be to select a manageable number of stress levels with the maximum usage, but allow fringe requirements to be included in the same specifications structure where justified.

ADVANTAGES OF PRODUCTION AND TESTING TO COMMON STANDARDS

21. Whilst recognizing the varying requirements of users, the Committee nevertheless considers it a matter of the first importance to manufacturers and users of electronic parts that, to the greatest practicable extent, parts should be made and tested to common standards. More extensive mass production would not only be more economical but would facilitate a greater degree of quality control leading to improved uniformity of parts. Furthermore, standardized batch sampling and cumulative endurance testing would enable the most informative reliability data to be obtained at the minimum cost per unit.

CATEGORIES OF PARTS TO BE COVERED BY COMMON STANDARDS

22. The Committee considers that three categories of parts, covering those environmental stress levels with the maximum usage and offering reasonable assurances of quality, could cater for virtually all the requirements of the Services—and other public bodies such as the General Post Office—the capital goods Industry and the consumer goods Industry. The categories of parts recommended are as follows:

(i) *General Application*

Electrical, mechanical, environmental and life performances specified and assured to meet the bulk of requirements of the Services (60 %) and the capital goods Industry (80 %).

(ii) *Special Application*

A higher assurance of performance at the environmental stress levels of the General Application category, and/or some degree of assurance at higher stress levels.

(iii) *Commercial Application*

A lower assurance of performance at the environmental stress levels of the General Application category, or the same degree of assurance but at lower stress levels.

RELIABILITY DATA REQUIRED—PRESENTATION AND STATUS

23. The Committee considers that the amount of testing (see Appendix III) which would be necessary to enable parts manufacturers to give users an absolute assurance of high levels of reliability (i.e. an assurance which the parts manufacturers would be willing to have made contractually enforceable) would be prohibitively expensive, but it recommends that the position should be reviewed as information became available about the economies resulting from the manufacture and testing of parts in bulk to common standards.

24. Nevertheless, the extent to which the results of all acceptance tests compare with requirements in specifications is informative as regards the reliability of parts, and the Committee proposes that such information should be recorded by a system of periodic 'Certified Reliability Data Sheets', to be prepared by manufacturers (see 'Block 5' in paragraph 35).

25. The Committee considered the alternative of classifying life assurance data by the American (MIL) method of stating several reliability levels, each representing a range of failure rates (i.e. 'stratification'). In either case the data would necessarily be historical and could not give a positive assurance of the performance of parts from current and future production. The Committee decided to recommend the system of Certified Reliability Data Sheets, in preference to the American system of stratification, for the following reasons:

(i) The United Kingdom's output of electronic parts, being on a smaller scale than the U.S.A.'s, endurance testing on the American scale—which is necessary to provide the information on which strata can be based—would be uneconomic.
(ii) Strata represent arbitrary figures of failure rates, which may be based on accelerated testing: they do not give complete information about life-testing results.
(iii) Parts with failure rates ranging from 0·1 % to 0·95 % could come within one stratum, whereas the system which the Committee is recommending would give actual test results and be more flexible.

QUALIFICATION APPROVAL

26. The Committee considers that all electronic parts supplied to common standards should be subject to Qualification Approval to show (a) that the parts met all the technical requirements of the relevant specification and (b) that the manufacturer was able to make them in reasonable quantity and under adequate quality control and to inspect them against the specification. Parts which received Qualification Approval should then be included in a 'Qualified Products List'.

27. This system would:

(a) provide Government and industrial users with a list of manufacturers with whom orders could be placed with confidence that all requirements would be met;
(b) protect manufacturers whose products bad Qualification Approval against irresponsible claims by other suppliers that their parts met common standards requirements;
(c) enable the United Kingdom to fulfil its obligations (under STANAG 4093) regarding reciprocal recognition by NATO countries of one another's Qualification Approvals.

28. The Committee has recommended in Part 9 of its Report that an 'Electronic Parts (Inspection) Committee' should be responsible for all inspection and approval procedures in connection with common standards for electronic parts. In the case of Qualification Approval, the Committee envisages that a manufacturer whose inspection facilities had been approved (see paragraph 44 in Part 9), and who wished to obtain Qualification Approval for one of his products, would have the tests required by the relevant common standards carried out by his approved inspection organization under the surveillance of his Chief Inspector and the executive agent of the Electronic Parts (Inspection) Committee. On satisfactory completion of these tests, a test report, certifying that the results were accurate and that the requirements of the common standard had been met, would be signed by the Chief Inspector and countersigned by the executive agent of the inspection committee.

29. A copy of the certified test report would then be sent to the authority responsible for the management of common standards (the Committee has recommended in Part 11 of its Report that this should be the British Standards Institution), who would include the part in the 'Qualified Products List'. Copies of test reports should be available on payment, subject to any reservations by the manufacturers.

Part 7 — International Standardization

RECOMMENDATIONS REGARDING IEC, NATO AND MIL SPECIFICATIONS

30. The Committee recommends that the technical content of U.K. common standards should conform with International Electrotechnical Commission (IEC) Recommendations, and, where these did not exist, NATO basic specifications. If there were no relevant IEC or NATO specifications, U.K. common standards should not differ unnecessarily in technical requirements from American MIL specifications.

31. The Committee discussed the question of whether the United Kingdom should consider the extreme course of adopting American MIL specifications (instead of introducing its own common standards) in view of the influence which MIL specifications already had in European markets. The consensus was that MIL specifications would not be acceptable to all sections of the UK Industry, and that the trend in international standardization was towards IEC Recommendations and NATO basic specifications.

32. The Committee noted that STANAG 4093 provided a means of obtaining approval for UK parts against other NATO countries' military specifications.

Part 8 — The Pattern of Common Standards

INTRODUCTION

33. If specifications for individual electronic parts contained all relevant information about technical characteristics, approval and acceptance requirements, etc., they would be unnecessarily bulky. The Committee has therefore devised a system of specifications in five parts, which, for the time being, it has called the Block system. Block 1 would describe the whole system (e.g. the method of preparing specifications, the qualification approval and inspection systems, and all technical information common to the whole field of electronic parts or a significant sector of it). Blocks 2 to 4 would become progressively more specific to a particular electronic part or range of parts. Block 5 would be the Certified Reliability Data Sheets referred to in paragraph 24 above.

34. The Committee has prepared draft documents (not attached) to demonstrate that the concept described above is feasible. In devising this pattern, the Committee has had in mind the points that the system should be flexible enough to permit new methods and techniques to be introduced quickly, and that unnecessary proliferation of specifications should be avoided.

THE 'BLOCK' SYSTEM

35. The system of specifications proposed is described in more detail below:

Block 1

A system of documentation covering subjects applicable to several families of parts. It would include a general explanation of the whole scheme, terminology, general requirements and environmental testing procedures for the purpose of qualification and acceptance testing, mechanical interchangeability, etc. Much of the necessary material is already available in such basic documents as IEC 68, IEC147, DEF.5001C, DEF.5011, K1001 and K1007.

Block 2

A collection of documents, additional to Block 1, each containing information and requirements peculiar to one family of electronic parts, (e.g. capacitors, or resistors, or transistors). Each document, in association with the Block 1 system of documentation, would fully define the requirements for one family of parts. An essential part of Block 2 documents would be lists of tests and measurements to be included as minimum requirements in the detail specifications for particular parts: e.g. a fixed paper capacitor, or a variable capacitor, etc. These lists, which the Committee has called Specification Writers Guides, would be the basis for detailed specifications for particular parts.

Block 3

Detail specifications for particular parts normally produced by more than one manufacturer. These specifications would have a uniform layout and would conform with the requirements of the relevant Blocks 1 and 2.

Block 4

As Block 3, but specifying a particular manufacturer's product having discrete characteristics. A Block 4 would be either a proprietary variant of a Block 3 specification to meet a particular requirement, or a new part introduced before a Block 3 existed. It would be written in accordance with the relevant Block 2 Specification Writers Guide. Block 4 standards would enable improvements to be introduced without the delays inevitable when many interested parties have to be consulted.

(*Note:* Blocks 3 or 4 would be used to define parts for the purposes of procurement.)

Block 5

Certified Reliability Data Sheets (CRDS's). These would record the results of tests called for in the relevant Block 3 or 4 specifications to show how the performance of the parts tested compared with the minimum requirements. They would also record the results of measurements made of key characteristics to indicate their variability with time. The preparation of CRDS's every six months should be a mandatory requirement for parts in the General and Special categories, but optional for parts in the Commercial category (see paragraph 22 for the definition of these categories).

MODEL DOCUMENTS

36. Model Specification Writers Guides (for inclusion in Block 2), illustrating the salient technical features of certain Block 3 and 4 specifications, are appended as follows:

Appendix IV: Introduction

Appendix IVA: Specification Writers Guides for a fixed resistor, an L.F. connector and a low power amplifier transistor for the General Applications category. These are tabulated together for purposes of comparison. They show the tests to be included in relevant detailed specifications, and the level of inspection and the acceptance quality level associated with each test. The appropriate sampling tables are given in DEF.131 or 131A.

Appendix IVB: As Appendix IVA, but covering the Commercial Application category.

37. Specification Writers Guides for parts in the Special Applications category are not included. It is envisaged that specifications for such parts would normally supplement rather than replace those for parts in the General Application category. This arrangement would ensure that, where possible, reliability data collected in CRDS's under General Application Specifications would be shown to apply to parts in the Special Application category. This arrangement would not only have the merit of economy and simplicity, but would also enable reliability tests to be based on the greatest possible output.

NON-STANDARD PARTS

38. If the Committee's aims for meeting military and capital goods Industry user requirements (see paragraph 22(i)) were realized, there would be a big reduction in the number of non-standard parts employed in electronic equipment. At present, the inadequate control of the wide range of variants of standard parts is a growing embarrassment to users and manufacturers.

Part 9 — Inspection

COMMON SYSTEM FOR MILITARY AND INDUSTRIAL REQUIREMENTS

39. The Committee considers that, if common standards were introduced for military and industrial requirements, it would be logical and economical for inspection procedures in the two fields to correspond as closely as practicable.

REQUIREMENTS

40. The inspection system should provide for:

(i) approval of the manufacturer's inspection organization:

(ii) certification that manufacturers' Block 4 specifications met the requirements of the relevant Blocks 1–3 specifications:

(iii) certification of Qualification Approval:

(iv) a list of approved products (Qualified Products List):

(v) acceptance testing:

(vi) common Release Notes:

(vii) verification of Certified Reliability Data Sheets (CRDS's).

INSPECTION AUTHORITY

41. In accordance with the recommendation in Part 11 of this Report that the BSI should undertake the management of common standards, it is proposed that the BSI should set up an 'Electronic Parts (Inspection) Committee' with overall responsibility for inspection requirements and procedures. The committee should be composed of representatives of Government Departments, industrial users and manufacturers of parts. The Committee's decisions should be binding only in areas of mutual concern: in other matters both Industry and Government should be free to act independently.

42. It is also considered that, in order to inspire confidence on the part of users, the inspection processes should be monitored by this inspection committee, acting through an executive agent.

43. The Committee recommends that inspection procedures should be based upon the Ministry of Aviation's 'Inspection Approved Firms' scheme, whereby inspection is carried out by manufacturers' approved inspection staff operating under the surveillance of the Ministry's inspection authorities. It would be logical, therefore, to appoint the Ministry's Electrical Inspection Directorate (EID) as the executive agent of the proposed inspection committee. The Committee recognizes, however, that such an appointment would need to be reconciled with EID's constitutional position under the Crown, and with its independent responsibility for the inspection of stores supplied to the Crown; and that the Ministry of Aviation would need to consider the question of any additional expense involved.

PROCEDURES FOR 'APPROVED FIRMS' INSPECTION

44. The procedures envisaged are described in detail in Appendix V. In essence they are as follows:

(i) The agent of the inspection authority would examine the manufacturer's inspection facilities and the qualifications of his Chief Inspector.

(ii) If the results of the examination at (i) were satisfactory, the manufacturer would be given 'Inspection Approved Firm' status, and responsibility would be vested in his Chief Inspector (acting under the surveillance of the agent of the Electronic Parts (Inspection) Committee) to undertake, in accordance with requirements laid down in common standards, all qualification and acceptance tests, the certification of test reports, and the preparation of CRDS's.

RESPONSIBILITIES OF THE ELECTRICAL INSPECTION DIRECTORATE

45. The Committee recognizes that, under this system, EID, if appointed as the agent of the Common Standards (Inspection) Committee, might be concerned with the approval of manufacturers (probably a negligible number) who wished to supply parts to common standards, but solely to commercial customers. It considers that such manufacturers should pay for EID's services (probably via the Electronic Parts (Inspection) Committee in order to obviate the appearance of Government supervision of commercial activities), but it does not rule out the possibility that an inspection agent other than EID might be appointed to deal with such cases.

RELEASE NOTES

46. The Committee considers that a properly completed and validated Release Note would be essential to cover every delivery of parts made under the proposed scheme. A model Release Note suitable for general use is at Appendix VI.

FOREIGN MANUFACTURERS

47. The Committee recommends that foreign manufacturers wishing to supply parts to the proposed common standards must be subject to the same disciplines of qualification and inspection as United Kingdom manufacturers.

Part 10 — Codification and Stockholding of Parts for the Services

IMPOSSIBILITY OF CODIFYING RELIABILITY

48. The life test data to be recorded in Certified Reliability Data Sheets (CRDS's) would be historical and would therefore give an indication but not a positive assurance of the quality of current and future production. Furthermore, the United Kingdom Cataloguing and Codification Authority has stated that reliability could not be treated as an attribute for codification purposes unless general NATO approval were obtained for a change in 'descriptive patterns'. For these two reasons it would be impossible to codify different manufacturers' products on the basis of longevity as indicated by CRDS's. It would be possible, however, to stock as spares those parts shown by CRDS's as likely to be the most reliable at the time of purchase. It would then be improbable that any equipment would be serviced with parts of a lower quality than those fitted initially.

49. This procedure would be similar to the Navy's existing practice of using a 'Substitution Guide' to reduce the variety of spare resistors and capacitors carried on board ship, and yet ensure that the substitute part is as good as, or better than, the part replaced.

50. If a particular manufacturer's part possessed discrete design features (as distinct from longevity) then the part would be individually referenced (i.e. in a separate Block 4 specification as defined in paragraph 35).

51. The effect of the above arrangements would be to obviate the considerable increase in the range of spare parts which would occur if an attempt were made to codify parts according to reliability levels.

PREFERRED LISTS

52. Industry and the Services recognise the need to minimize the range of parts by using 'preferred lists'. The Services already publish a preferred list of valves and semi-conductors, and the Ministry of Defence (Navy Department) and some sections of Industry use preferred lists for certain passive components. The Committee recommends that, if its report is adopted, the Services should explore with the Electronic Engineering Association the possibility of agreeing a common preferred list.

NATO STOCK NUMBERS

53. The standard layouts for Blocks 3 and 4 specifications should provide for NATO stock numbers to be allotted to all parts covered by Block 3 specifications in the General Application category, and, where there was a military interest, to parts covered by Block 4 specifications in this category and to Blocks 3 and 4 in the Special Application category. Inclusion of a part in the Qualified Products List would not automatically entitle it to a NATO Stock Number: a NATO number would be allotted only when the part was proposed for military use. It is considered unlikely that the Services would issue NATO Stock Numbers for parts in the Commercial Application category in which there was no military interest.

54. The United Kingdom Cataloguing and Codification Authority has said that it would be willing to issue a block of NATO Stock Numbers to a Government body (preferably the one concerned with Qualification Approval requirements).

Part 11 — Machinery for Preparing and Publishing Common Standards

REQUIREMENTS

55. The Committee has had the following basic requirements in mind:

(i) procedures must be as simple and speedy as possible, but must allow essential consultation to take place:

(ii) specifications should be given the highest possible status, both at home and abroad, by being issued as national standards, or (in the case of individual Block 4 specifications) by being identifiable as conforming with national standards:

(iii) individual specifications should conform with uniform requirements and layouts.

CENTRAL ORGANIZATION—USE OF THE BRITISH STANDARDS INSTITUTION

56. The Committee has considered whether the British Standards Institution should be invited to undertake the management of the proposed system of common standards, or whether a separate organization should be created. The main argument against using the BSI is that its existing committee system works slowly. The arguments in favour of using the BSI are:

(i) it would probably be simpler, speedier, and more economical in manpower to use an existing organization than to create and staff an entirely new one:

(ii) it is Government policy to use and promote the use of British Standards wherever possible, and to do all it can to improve their status at home and overseas:

(iii) the BSI provides a link with international work on standardization:

(iv) the BSI has a unique legal standing in relation to the Restrictive Trade Practices Act and would be protected from legal action by, for example, firms rejected under Qualification Approval procedures:

(v) the BSI has stated that it is willing to adapt its organization (within its constitution) to meet any additional responsibilities laid upon it.

57. The Committee therefore recommends that the BSI should be invited to manage the proposed system of common standards for electronic parts.

RESPONSIBILITY FOR PREPARING AND PUBLISHING SPECIFICATIONS

58. The Committee recommends that Blocks 1, 2 and 3 (which, as defined in paragraph 35, would not be associated with one particular manufacturer) should be prepared and published by the BSI as British Standards.

59. In considering whether Block 4's (which would describe a particular manufacturer's product (see paragraph 35)) should be published by the BSI or manufacturers, the Committee has taken account of the following points:

(i) in the case of passive parts the usual practice would be for one Block 3 specification to cover several manufacturers' products; in the valve and semi-conductor field, however, the present trend is towards there being sole manufacturers of particular parts, and so specifications would customarily start as Block 4's and only later coalesce in one Block 3 if several firms produced parts that were sufficiently similar:

(ii) the BSI would be willing to publish Block 4's, but the task would be onerous, and, as manufacturers' names would be included, the Block 4's could not be classed as British Standards:

(iii) VASCA firms would normally wish to publish Block 4's themselves, and it would be neither reasonable nor practicable to ask BSI to publish some but not all Block 4's:

(iv) parts manufacturers would have an incentive to publish particulars of their new products promptly:

(v) the cost of Qualification Approval testing and CRDS disciplines would discourage manufacturers from creating unnecessary minor variants of specifications.

60. The Committee therefore recommends that Block 4's should be prepared and published by parts manufacturers (in a uniform layout). The procedure envisaged is that manufacturers would register draft Block 4's with the BSI and simultaneously send a copy of the draft to the inspection authority's agent. The BSI would allot a specification reference number and suggest editorial amendments as necessary. The specifications would not otherwise be scrutinized by BSI committees (though the committees responsible for Blocks 2 and 3 specifications should see all completed Block 4's). A flow chart showing the procedure envisaged for Block 4 specifications is at Appendix VII.

61. The Committee considers that manufacturers should not be permitted to claim copyright in a Block 4 (i.e. in an aspect of a system of national standards). Other firms must be free to publish identical specifications bearing their own names if desired. A manufacturer could protect the proprietary nature of a new design by launching the product by means of his own Data Sheet and writing a Block 4 specification later, when design and manufacture were sufficiently stabilised. This is expected to be the normal evolutionary process for new designs.

62. Block 5 (Certified Reliability Data Sheets) would relate to particular manufacturers' products. Their preparation and issue must therefore be the manufacturers' responsibility, but the CRDS's should conform with requirements (including a prescribed layout for the type of product) stated in the relevant Block 2.

QUALIFIED PRODUCTS LIST

63. The Committee considers it essential that the status and presentation of the Qualified Products List (see Paragraphs 26 and 29) should be at least comparable with that of the similar U.S. military list. It recommends that the list should be published and maintained by BSI.

AVAILABILITY OF DOCUMENTS

64. Blocks 1, 2 and 3 and the Qualified Products List would be available from the BSI on payment. Applicants for Blocks 4 and 5 documents should refer to the Qualified Products List showing qualified suppliers from whom these documents could be obtained. Manufacturers should supply copies of CRDS's to Government and bona fide industrial customers on request, or through normal trade channels.

LIAISON WITH NATO

65. The United Kingdom's representatives on NATO committees dealing with electronic parts would need to keep closely in touch with BSI committees to ensure that, as far as possible, the same line was being followed in both fields.

Part 12 — Organization of the British Standards Institution

66. The Committee considers that it would be undesirable to create a separate organization within the BSI to deal specifically with common standards for electronic parts.

67. The Committee therefore recommends that responsibility for drafting Blocks 2 and 3 should rest with the existing Technical Committees of the Telecommunication Industry Standards (TLE) Committee. It considers, however, that, to enable common standards to be introduced and published with the speed required to make them fully effective, it would be necessary for them to be prepared by small specialist panels set up by the TLE

Technical Committees. The membership of these panels would have to be acceptable to all interested parties and should be as small as possible.

68. The Committee also considers that an 'Electronic Parts (Standards) Co-ordinating Committee' should be set up in parallel with the TLE Steering Committee and under both the TLE Committee and a new Electronic Parts (Standards) Committee (see paragraph 70) to co-ordinate the work of the specialist panels and to ensure that there was no departure from agreed principles, and no inconsistencies of practice between the various fields. Drafts prepared by the panels would be submitted simultaneously to the Co-ordinating Committee, the Technical Committees, Industry and the Government Departments concerned. The Co-ordinating Committee would not necessarily be permanent, but might in due course amalgamate with the TLE Steering Committee.

69. As Block 1 would involve non-technical as well as technical material, it should be made the responsibility of the Electronic Parts (Standards) Co-ordinating Committee.

70. The Co-ordinating Committee would provide liaison with the Electronic Parts (Inspection) Committee, but it is considered that the BSI should also set up, under the General Council, a new committee (an Electronic Parts (Standards) Committee) to supervise the implementation of the proposed system of common standards, especially in the transitional phase.

71. The proposed BSI organization is shown in the chart at Appendix VIII. This chart includes the inspection committee referred to in paragraph 41.

Part 13 — Referencing of Common Standards

REQUIREMENTS

72. The Committee considers that the numbering system for common specifications should:

(i) enable specifications to be immediately identified as common standards distinct from existing British Standards;

(ii) indicate the family of parts to which Blocks 3 and 4 specifications related.

BLOCKS 1, 2 AND 3

73. Blocks 1, 2 and 3 should be numbered serially as British Standards in discrete series (e.g. B.S. 9000–9009 for Block 1, B.S. 9010–9099 for Block 2, and B.S. 9100–9999 for Block 3).

BLOCK 4

74. The reference for Block 4's should consist of 'EP' for Electronic Part, a two-letter code to identify the family of parts, and a digital serial number for each family of parts. The reference for a fixed resistor specification would then be, say, EP/RF/001.

75. New Block 4 specifications which superseded existing Block 4's should say so, in order to facilitate control of stocks of superseded parts.

76. Manufacturers would be free to use their own reference numbers as an additional identification on Block 4 specifications.

IDENTIFICATION OF DOCUMENTS

77. The BSI would not expect to use such terms as 'Blocks 1 to 3' in the nomenclature of common standards. It is therefore proposed that, for the time being, Blocks 1 and 3 should be known as the Nine Thousand Series, Block 4 as the EP Series, and Block 5 as Certified Reliability Data Sheets (CRDS).

Part 14 — Purchasing Procedures (Taking Account of Reliability Data)

78. As stated in paragraph 48, test results shown in Certified Reliability Data Sheets would be historical (i.e. they would give an indication but not a positive assurance of the quality of current and future production). Furthermore (see paragraph 23), it would not be economically feasible for manufacturers to test parts on a scale which would enable them to give absolute assurances of high levels of reliability. For these reasons, CRDS's would not have contractual force, and therefore they would not appear in tender or contract documents. The Committee notes, however, that the Ministry of Defence (Navy Department) and the Ministry of Aviation would expect to take account of a technical assessment of CRDS's in selecting manufacturers to be invited to tender and in awarding contracts.

79. The Ministry of Aviation and the Ministry of Defence (Navy Department) have said that they would expect Industry for its part to affirm its acceptance of these implications of the use of CRDS's, as the Departments might otherwise be faced with complaints from manufacturers unsuccessful in obtaining Government contracts.

80. The VASCA and RECMF representatives have questioned the proposal that CRDS's should be taken into account in selecting firms to be invited to tender and have asked that, if this proposal were implemented, Government Departments should disclose to accredited sources in Industry the total value of contracts being placed for individual electronic parts. The Committee recommends this request to the consideration of the Departments concerned.

81. The Committee has noted the following points made by the Ministry of Defence (Navy Department) and the Ministry of Aviation:

(i) *Running Contracts*

Running contracts should be placed in accordance with the principles stated above. If, during the period of a contract, CRDS's indicated a significant deterioration in quality, the procurement authority might stop 'call off' orders. Running contracts should be reviewed annually, or after submission of two CRDS's, whichever period was the shorter.

(ii) *Purchases by Manufacturers of Parts for Military Equipment*

Equipment manufacturers buying parts for equipment intended for the Services should take into account a technical assessment of the CRDS's.

Part 15 — Assessment of the Effects of Common Standards on the Cost of Parts and of User Requirements

THE OBJECTIVES

82. The Committee's primary objective has been to devise common standards (i.e. the 'General Application' category described in paragraph 22(i)) which might reasonably be expected to cover approximately 80 % of the capital goods Industry's requirements and 60 % of military requirements. Unless this objective was achieved, the economic benefits of production and testing to common standards would largely be lost, and testing aimed at giving higher quality assurances would be restricted to a smaller output.

ASSESSMENT OF COSTS

83. Recognizing that, in deciding which category of parts to buy, users would be influenced by price, the Committee has attempted to assess the extent, if any, to which (given certain assumed levels of consumption) the cost of parts in the 'General Application' category would be likely to rise above present levels, solely as the result of the introduction of common standards.

84. VASCA considers that the cost of such (active) parts in large scale production would be likely to rise only marginally above the cost of the present-day industrial products. In the case of passive parts, the view of the RECMF representatives is that, as the technical standards of the 'General Application' category (as proposed in Appendix IVA) are similar to those of specification DEF-5001C, but with provision for the assessment of reliability, the cost of 'General Application' passive parts produced on a large scale would be only marginally higher than the cost of DEF-5001C parts. As the technical specifications to which passive parts for industrial use are at present purchased vary widely, the RECMF has not found it possible to make a similar, meaningful, comparison between the cost of such parts and of parts in the 'General Application' category.
In both the active and passive fields the unit cost of additional testing would vary with the nature of the product, the technical requirements of the specification, and the scale of production. For example, the extra cost would be disproportionately high in the case of special valves or complex passive parts produced in small quantities.

ASSESSMENT OF USER REQUIREMENTS

85. The EEA has expressed the view that, because there are growing demands for equipment reliability assurances, the additional production sampling and the information supplied by Certified Reliability Data Sheets would normally justify any marginal price increases for 'General Application' parts as compared with their 'Commercial Application' counterparts. They believe that the technical, economic and administrative benefits of using common parts for military and industrial requirements would be such that equipment manufacturers would depart from this practice only if serious price differentials occurred.

CONCLUSIONS

86. The Committee considers that there are too many imponderable factors for it to be possible to reach a firm conclusion as to the percentage of total requirements which would be met by parts in the 'General Application' category. It is convinced, however, that it would be in the self-interest of all concerned—manufacturers and users alike—to have a system of common standards covering the bulk of requirements, and it believes that the target stated in paragraph 82 (80 % of capital goods Industry requirements and 60 % of military requirements) is achievable.

87. One of the advantages of associating military requirements with those of Industry would be to minimize the number of small, highly-specialized and, therefore, uneconomic requirements. The Committee recognizes, however, that the concepts outlined in this report could not be applied to very expensive electronic parts, especially if their production was on a small scale and intermittent.

Part 16 — Assessment of Operational Costs and Manpower Requirements

88. It is self-evident that a system of common standards would make more economical use of administrative, technical and clerical effort in a number of ways but the Committee does not consider it possible to evaluate, or even specifically identify, all of them. The salient points upon which the Committee has agreed are:

(i) The preparation of common standards would require additional technical effort —especially in the transitional phase—but so would reduction of the Radio Components Standardization Committee's hacklog of work on drafting Joint-Service DEF specifications—a backlog which has provoked criticism at a high level by Government authorities responsible for standardization. Furthermore, the work of the BSI's TLE Committee is growing under the present system.

(ii) The use of common standards would reduce the variety of committees concerned with the preparation of specifications: there would therefore be a saving in technical and clerical effort in Industry and Government departments, and the limited technical manpower available for standardization, testing and inspection activities would be more effectively utilized.

(iii) The BSI would need to provide additional secretariat and editorial services, but would not be able to assess the number of staff required until a detailed programme for the introduction of common standards had been prepared. It would assist BSI if, in the introductory stage, other interested bodies were able to second secretariat staff to them.

Part 17 — Implementation — Timing

89. The Committee recommends that sufficient effort should be deployed to enable the system of common standards it has recommended to be in operation—though not necessarily covering the whole range of electronic parts—within one year of acceptance of its report: i.e. that specifications ought to have been proved, agreed and published and products approved that met their requirements.

90. For passive parts, specification DEF.5001C would provide a convenient transition to the requirements of common standards.

91. The Committee considers that a reasonable target would be to replace current DEF and CV specifications by 1968.

Part 18 — Summary of Recommendations

92. A brief statement of the Committee's findings on the subjects specifically mentioned in its Terms of Reference is given below. The complexity and inter-relationship of the subjects covered by the report make it difficult, however, to summarize all the Committee's recommendations intelligibly without repeating much of what has already been said above. The Committee therefore hopes that the 'List of Contents', by enabling particular parts of the report to be readily identified, will take the place of a full summary of recommendations.

> *Items (1) & (4)*: What form of specifications for electronic parts could meet the requirements of Government departments and the capital goods Industry, without division into separate parts to reflect divergent standards and with regard to international standardization; and to what extent could such specifications be applied, without relaxation of their standards, to the requirements of other users?
>
> *Recommendations:*
>
> (i) One category of specifications could not meet all military and capital goods Industry requirements, but a system of common standards is proposed with a 'General Application' category which the Committee believes would cover 60% of military and 80% capital goods Industry requirements. The system would also cover major requirements which were either more or less stringent, mainly by varying the provision for testing.
>
> (ii) The technical content of common standards should conform with international Electrotechnical Commission (IEC) Recommendations or with NATO basic specifications.
>
> *Item (2)*: Would specification DEF.5011 alone adequately define general environmental requirements?
>
> *Recommendations:*
>
> DEF.5011 alone would not be adequate. The Committee has recommended that general environmental requirements should be compiled from DEF.5011 and 5001C, K.1001 and 1007, and IEC.68 and 147.
>
> *Item (3)*: Would it be practicable to state reliability requirements in quantitative terms in common standards?

Recommendations:

If high standards of reliability were stated as a mandatory requirement in specifications, the amount of testing which parts manufacturers would need to undertake, to ensure that their products met the requirement, would be prohibitively expensive. A means is proposed, however, whereby data derived from all acceptance and life tests would be made available by manufacturers as an indication of reliability levels.

93. The Committee wishes to record its view that the discussions which have taken place during the last two years, in the Committee and its various sub-committees, have been of great value in reconciling differences of opinion and promoting understanding and co-operation between the Industry and Government departments and between the various sides of the Industry, particularly in unifying procedures in the fields of active and passive parts.

G. F. BURGHARD
Chairman

N. H. WICKERSON
Secretary

12th May, 1965

APPENDIX 1

List of Members of the Committee

Chairman
Rear Admiral G. F. Burghard, C.B., D.S.O.

British Standards Institution
Mr. P. Bingley
Mr. E. P. Blake

Electronic Engineering Association
Mr. A. H. Cooper, C.B.E.
Mr. E. S. Hall
Mr. R. W. Kersey
Dr. G. D. Reynolds
Mr. A. Sadler

Radio and Electronic Component Manufacturers Federation
Mr. A. C. Bentley
Mr. A. W. Eva
Mr. R. T. Lovelock
Mr. G. Pearce
Mr. K. G. Smith
Dr. E. P. Stanton, M.B.E.
Mr. E. H. Toder

Electronic Valve and Semiconductor Manufacturers Association
Mr. D. F. Egan
Mr. P. A. Fleming
Mr. A. Lindell
Mr. R. E. B. Wyke

General Post Office
Mr. W. H. Maddison

Ministry of Defence (Navy Department)
Mr. G. W. A. Birkett, C.B.E.
Capt. R. L. Clode, R.N.
Mr. J. I. G. Evans
Mr. J. T. Hales
Mr. J. M. Peters

Ministry of Aviation
Mr. H. E. Drew
Mr. E. D. Whitehead, M.B.E.
Brigadier E. Holland
Mr. J. D. Hinchcliff
Mr. E. J. Hiles [now Ministry of Defence (Army Department)]

Secretary
Mr. N. H. Wickerson (Ministry of Aviation)

Note: The membership of the Committee underwent some changes during the two years of the Committee's activities, and not all the above persons were members throughout.

Appendix II

Membership and Terms of Reference of the Sub-Committees

Note: The membership of the sub-committees underwent some changes during the course of their activities, and not all the persons listed were members throughout.

Reliability Sub-Committee

TERMS OF REFERENCE

The Sub-Committee was set up initially to consider 'reliability and associated questions' in the context of common standards for electronic parts, but the Sub-Committee decided at its first meeting that it could not effectively consider the inclusion of reliability data in a system of common standards without considering also the pattern of such standards. The Sub-Committee therefore undertook the task of devising a pattern of specifications.

MEMEBERSHIP:

Chairman
Mr. H. E. Drew (Ministry of Aviation)

British Standards Institution
Mr. P. Bingley

Electronic Engineering Association
Mr. P. R. Bardell
Mr. R. W. Kersey
Mr. S. A. Wales

Radio and Electronic Component Manufacturers Federation
Mr. D. R. Bell
Mr. D. S. Girling
Mr. A. G. Manson
Dr. E. P. Stanton, M.B.E.

Electronic Valve and Semiconductor Manufacturers Association
Mr. R. Brewer
Dr. J. M. Groocock
Mr. G. R. Latham
Mr. A. Lindell

Ministry of Defence (Navy Department)
Mr. J. M. Peters
Mr. J. T. Hales

Ministry of Aviation
Mr. E. D. Whitehead, M.B.E.
Mr. J. D. Hinchcliff
Mr. E. J. Hiles
Mr. K. Hopkinson
Mr. S. C. Schuler
Mr. F. C. B. Smith

Secretary
Mr. N. H. Wickerson (Ministry of Aviation)

Administration Sub-Committee

TERMS OF REFERENCE

To consider and report on the procedural implications of common standards for electronic parts for military and industrial requirements.

Chairman
Mr. G. W. A. Birkett, C.B.E. (Ministry of Defence (Navy Department))

Electronic Engineering Association
Mr. H. D. Ramplin
Mr. E. A. Rea Palmer

Radio and Electronic Component Manufacturers Federation
Mr. A. C. Bentley
Mr. F. W. Irons
Mr. K. G. Smith
Mr. E. E. Webster

Electronic Valve and Semiconductor Manufacturers Association
Mr. B. R. Bettridge
Mr. P. G. Townsend
Mr. J. V. Tyndall

Ministry of Defence (Navy Department)
Mr. C. E. Airey
Mr. J. S. Borbon
Mr. J. I. G. Evans
Mr. J. T. Hales
Mr. J. L. Orman
Mr. F. E. Parr
Mr. J. M. Peters
Mr. A. N. Piper
Mr. G. E. Thomas

Ministry of Defence (Army Department)
Col. F. Snape
Lt. Col. A. F. Weldon
Major B. R. Martin

Ministry of Defence (Air Force Department)
Mr. D. R. Cleeveley
W/Cdr. J. R. I. R. Sanceau

United Kingdom Central Cataloguing Authority
Col. B. B. Jackson

Ministry of Aviation
Mr. J. Watson
Mr. J. D. Hinchcliff
Mr. N. H. Wickerson
Mr. C. J. Baker
Mr. H. J. Hewitt
Mr. K. F. Maynard

Secretary
Mr. R. Bunyan (Ministry of Aviation)

Inspection Sub-Committee

TERMS OF REFERENCE

(1) To consider the main Committee's proposal that a joint management body, in which Industry and the Government would be equally represented (but which would leave both sides free to make independent decisions in areas of sole concern to either) should be set up with responsibility for surveillance over Qualification Approval and acceptance testing and for approval of manufacturers' inspection organizations.

(2) To recommend ways and means of implementing this proposal with particular reference to:

(a) the form of Qualification Approval required by Industry and the Government;

(b) the method of signifying such Qualification Approval;

(c) the possible use of Crown inspection organizations (e.g. the Directorate of Electrical Inspection).

(3) To consider and make recommendations on any administrative problems arising.

Chairman
Mr. A. H. Cooper, C.B.E. (Electronic Engineering Association)

Electronic Engineering Association
Mr. P. F. Warren

Radio and Electronic Component Manufacturers Federation
Mr. A. W. Eva
Mr. G. Pearce
Mr. K. G. Smith
Dr. E. P. Stanton, M.B.E.

Electronic Valve and Semiconductor Manufacturers Association
Mr. A. Lindell
Mr. R. E. B. Wyke

Ministry of Defence (Navy Department)
Mr. H. E. Arnold
Mr. J. M. Peters
Capt. J. C. Rome, R.N.

Ministry of Aviation
Mr. E. D. Whitehead, M.B.E.
Mr. E. J. Hiles
Mr. J. D. Hinchcliff
Mr. N. H. Wickerson

Secretary
Mr. P. Tucker (Ministry of Aviation)

Machinery Sub-Committee

TERMS OF REFERENCE

To consider and make recommendations on the machinery and procedures required for the preparation and publication of common standards.

Chairman
Mr. K. G. Smith (Radio and Electronic Component Manufacturers Federation)
(later) Dr. G. D. Reynolds (Electronic Engineering Association)

British Standards Institution
Mr. P. Bingley

Radio and Electronic Component Manufacturers Federation
Mr. G. Pearce

Electronic Valve and Semiconductor Manufacturers Association
Mr. P. A. Fleming
Mr. A. Lindell

Ministry of Defence (Navy Department)
Mr. J. T. Hales

Ministry of Aviation
Mr. J. D. Hinchcliff
Mr. E. J. Hiles

Secretary
Mr. N. H. Wickerson (Ministry of Aviation)

Appendix III

The Problems of Assuring the Reliability of Electronic Parts

In order to design and manufacture electronic equipment of the highest possible reliability consistent with acceptable cost, the designer requires assurances about the failure rates which can be expected from the parts he proposes to use, when they are operating in the actual environmental conditions of the equipment in service. The manufacturer of the equipment also requires assurances that the parts to be used in production equipment will be as good as those specified by the designer. Two fundamental and inter-related difficulties arise in providing these assurances.

2. The first is the very large amount of testing required to give the necessary assurances. The worst failure rate likely to be of value in this context is 0·1% per 1000 hours: i.e. a Mean Time Between Failures of 1 million hours (and designers often require a figure 10 or 100 times better than this). To be 90% certain that a part will have a failure rate no worse than this, it is necessary for nearly 2½ million part-hours* of testing, *on parts uniform with the one to be used,* to have been completed with no failure having occurred. (The corresponding figure with 4 failures is 8 million part-hours.) The better failure rates required for very complex equipment necessitate proportionately more testing to give this assurance; thus ·001% per thousand hours would require 230 million part-hours' testing without failure for 90% confidence.

3. Since the amount of testing required to give a certain level of confidence in the reliability of a number of uniform parts is the same whether one or a million of these are to be used, and as this testing is very expensive, there would be great economic advantages in increasing, to the maximum possible extent, the number of parts covered by a given test programme. Therefore, all requirements for similar types of parts should be unified under common specifications so that all users might economically obtain the advantages of one series of tests. Even with the maximum conceivable integration of demands in this way, however, the cost, in terms of both price and delay, of carrying out testing on this scale to accept a single batch of parts would be unacceptable.

4. The Committee's proposals regarding the reliability of parts delivered against the proposed specifications are aimed at the accumulation of confidence by the successive testing of uniform parts. Each test in itself, whilst economically acceptable, would be insufficient to give the necessary confidence, but, provided the product was kept uniform by control of production, materials, processes, etc., this confidence would accumulate statistically and give an implied assurance regarding parts delivered against particular contracts (although the results of tests on samples from the batch delivered might not be available for some time after delivery). Such an assurance could not, however, be made an acceptance requirement in contracts.

5. The other main difficulty arises from the fact that the actual environment in which parts are used varies over a wide range and is seldom uniform. This factor is in conflict with the concept in Paragraph 3, which requires that a standardized environment should be used for all testing. The only practicable solution would be to adopt the absolute minimum number of standardized environments for test purposes—preferably one only—and carry out tests to determine the 'modifying factors' for life and other characteristics introduced by the actual environment envisaged as against the standard test environment. The disciplines proposed in the Committee's recommendations to ensure the uniformity of parts intended to be similar would assist in resolving this problem. The equipment designer would be able to establish the 'modifying factors' applicable to his particular environment by carrying out tests on parts which were known, as the result of the operation of the recommended disciplines, to be uniform with those which would be supplied against the same specifications for incorporation in the production equipment.

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* 'Part-hours' is the product of the number of parts tested times the number of hours for which they are all tested.

Appendix IV

Specification Writer's Guides

Introduction

1. The Block 1 document would outline the general basis for the preparation of detail specifications. Associated with each Block 2 document would be a number of different specification writers' guides, listing those measurements and tests necessary in detail specifications to ensure satisfactory performance of parts in their particular application categories: i.e. General, Special and Commercial.

2. Appendices IVA and IVB respectively give examples of such guides for the General and Commercial Application categories for certain resistors, connectors and transistors. They are reproduced together for comparison purposes. They would serve as a basis for discussion in BSI technical committees, where provision would also be made for adjustment of the guides, if and when this proved to be necessary.

3. The examples given do not include a guide for the Special Application category, where there would be a need for higher reliability assurance, particularly in the electrical endurance clauses, and further detailed negotiations would be necessary at the implementation stage.

Appendix IV A

Specification Writers' Guides for Block 3 and 4

Detail Specifications for British Common Standard Electronic Parts for General Application

1. The Detail Specification should include:

GENERAL INFORMATION

(a) *Description of the electronic part*

A brief narrative description of the distinguishing features of the part and its intended application.

(b) *Ratings and limiting conditions of use*

A statement of the electrical, thermal and environmental ratings of the part which would permit safe usage of the part. The capability of the part to withstand these ratings would be confirmed by appropriate tests in the Groups A–D inspection. If possible the ratings should be presented in tabular form for easy reference.

(c) *Characteristics*

The electrical/mechanical characteristics of the part of primary importance to its intended application should be given in tabular form. The conditions under which the characteristics were measured should be stated and maximum/minimum limits should be given. All the characteristics would be confirmed by appropriate tests in Groups A–D inspection.

(d) *Dimensions, outline drawing*

A brief reference to the appropriate drawing should be made and any relevant mounting instructions should be given.

2. In addition the Detail Specification should include Groups A, B, C and D inspection as follows:

Group A Inspection

(To be applied lot by lot)

Purpose of test	Example for resistor, fixed, non-wirewound	Example for L.F. connector (unsealed)	Example for transistor low power amp
Sub group 1 100% inspection General examination and to control primary characteristics	Gen. exam. Resistance	Gen. exam. Voltage proof	Gen. exam.
Sub group 2 Inspection level II, 0·65% AQL To control primary characteristics	Omitted	Contact holding force (without sizing	I_{CBO} at 25°C I_{CEX} or $V_{(BR)CEO}$ h_{FE} at 25°C
Sub group 3 Insp. level I, 2·5% AQL To control secondary characteristics	Voltage proof	Omitted	V_{BES} V_{CES} f_T I_{CBO} at 100°C IEBO
Sub group 4 Insp. level IA/C 4·0–6·5% AQL To control incidental characteristics	Temp. coeff. (1 cycle) Noise	Contact resistance at 2·5 volts 1A	Noise C_{ob} h_{FE} at −55°C h_{fe}
Sub group 5 Insp. level IC To give information on averages and spreads of important parameters	Individual Specification Writers' Guides would state which of the above parameters were to be measured and recorded for CRDS purposes.		

Group B Inspection

(To be applied on an acceptance sampling inspection basis lot by lot)

Purpose of test	Example for resistor, fixed, non-wirewound	Example for L.F. connector unsealed	Example for transistor low power amp
Sub group 1 Insp. level IC, 4·0% AQL To control mechanical interchangeability	Major dimensions (Gauging)	Compatibility Polarization	Major dimensions (Gauging)
Sub group 2 Insp. level IA, 4·0% AQL To simulate assembly procedures and their effect on the part during storage and transit when assembled into equipment	Solderability Robustness of terminations Bump test Climatic sequence to appropriate severity	Solderability Soldering (resistance to beat) Contact holding force with sizing	Solderability Temperature cycling Moisture resistance (short term)

Note: It is permissible to group together parts having a common construction or encapsulation for acceptance test purposes on these sequences, e.g. 1 watt resistors, or silicon transistors in T05 cans.

Purpose of test	Example for resistor, fixed, non-wirewound	Example for L.F. connector unsealed	Example for transistor low power amp
Sub group 3 Insp. level IA, 4·0% AQL To control the mechanical robustness of the part during assembly into equipment	Omitted (but see above sequence)	Omitted (not applicable)	Lead fatigue
Sub group 4 Insp. level IA, 4·0% AQL To control electro-mechanical characteristics	Omitted	Contact and insert retention Robustness of terminations	Omitted (not applicable)
Sub group 5 Insp. level IC, 6·5% AQL To control the performance of the part during variations of air pressure	Low air press High air press as appropriate	As appropriate	As appropriate
Sub group 6 Insp. level IA, 4·0% AQL To control the effect of atmospheric or other forms of contamination	Omitted	Plating proving (gold plated contacts only)	Omitted
Sub group 7 Insp. level I, 0·4% AQL To assess the early failure characteristic of the part under conditions of electrical endurance	Electrical operation under rated conditions (Duration = 160 hours)	Omitted	Electrical operation under rated conditions (Duration = 160 hours. Inspection level S.4 1·5% AQL)

Note: The duration of 160 hours is recommended so that the decision on lot acceptance or rejection could be taken within one week. The particular guide would state which parameters were to be measured and recorded for CRDS purposes.

Purpose of test	Example for resistor, fixed, non-wirewound	Example for L.F. connector unsealed	Example for transistor low power amp
Sub group 8 Insp. level IA, 4·0% AQL As sub group 7 but for mechanical operation	Omitted	Mechanical endurance (50 operations)	Omitted

Group C Inspection

(To be applied on a sampling basis at three monthly intervals. Failure to pass the tests might cause rejection of the lot, or an investigation of the cause of failure and possibly withdrawal of 'Qualification Approval')

Purpose	Resistor	L.F. connector	Transistor
Sub group 1 Insp. level IC, 6·5% AQL To control detailed dimensions	Dimensions	Dimensions (outline) Engagement and disengagement (forces)	Dimensions
Sub group 2 Insp. level IC, 6·5% AQL To assess the ability of the part to withstand high temperatures	Soldering (resistance to heat)	Omitted	High temperature storage (Duration = 1000 hours Insp. level I, 1% AQL)
Sub group 3 Insp. level IC, 6 5% AQL To assess the performance of the part during mechanical stresses and strains	Vibration	Bump (at room temperature)	Shock Vibration Constant acceleration
Sub group 4 Insp. level IC To assess the medium life performance of the part under electrical and/or mechanical operation Approval or maintenance of approval would be based on 6·5% AQL	Electrical endurance (Duration 8000 hours)	Mechanical endurance (500 operations) Electrical endurance (500 hours)	Electrical endurance (Duration 2000 hours Insp. level $\frac{S4}{2}$)

Note: The duration of the test would be dependent on the part. The particular guide would state which parameters were to be measured and recorded for CRDS purposes.

Group D Inspection

(To be applied on a sampling basis at long intervals, e.g. 3 years. These tests are the remaining tests which are of a design proving nature necessary to complete and maintain the Qualification Approval of the part. This group might also contain long-term endurance tests for information purposes. Failure to pass the tests might cause an investigation of the cause of failure and possibly withdrawal of Qualification Approval.)

Purpose of test	Resistor	L.F. connector	Transistor
Inspection level IA for each test based on the average lot deliveries. Approval and maintenance of approval would be based on 4·0% AQL for each test	Temp. Coeff. (full duration) Temperature (rapid change) Damp Heat (long term)	Climatic sequence (as appropriate) Fire risk Vibration Shock Damp heat (long term) Temperature (rapid change)	Electrical endurance (Duration 8000 hours inspection level $\frac{S4}{2}$ annually) Cold storage (Temp. −55°C duration, 1000 hours)

Appendix IV B

Specification Writers' Guides for Block 3 and 4

Detail Specifications for British Common Standard Electronic Parts for Commercial Applications

1. The detail Specification should include:

GENERAL INFORMATION

See General Information in the 'General Application' model (Appendix IVA).

2. In addition the detail specification should include Groups A, B, C and D inspection as follows:

Group A Inspection

(To be applied lot by lot)

	Resistor, fixed non-wirewound	Plug and socket L.F. connector	Transistor low power amp
Sub group 1 100% inspection	General examination Resistance	General examination Voltage proof	General examination
Sub group 2 Insp. level II 0·65% AQL	Omitted	Omitted	I_{CBO} at 25°C I_{CEX} or $V_{(BR)CEO}$ h_{FE} at 25°C
Sub group 3 Insp. level I 2·5% AQL	Omitted	Omitted	Omitted
Sub group 4 Insp. level IC 6·5% AQL	Omitted	Contact holding force Contact resistance	V_{BE} sat V_{CE} sat f_T I_{CBO} at 100°C I_{EBO} h_{fe} Noise

Sub group 5

Insp. level IC Individual specification writers' guides would state which of the above parameters were to be measured and recorded for CRDS purposes.

Group B Inspection

(To be applied on an acceptance sampling basis, lot by lot)

	Resistor, fixed non-wirewound	Plug and socket L.F. connector	Transistor low power amp
Sub group 1 Insp. level IA 4·0% AQL	Omitted	Compatibility Polarization	Omitted
Sub group 2 Insp. level IA 4·0% AQL	Solderability	Solderability	Solderability
Sub group 3 Insp. level IA 4·0% AQL	Omitted	Robustness of terminations	Lead fatigue

Group C Inspection

(To be applied on a sampling basis at three monthly intervals. Failure to pass the tests might cause rejection of the lot, or an investigation of the cause of failure and possibly withdrawal of Qualification Approval.)

	Resistor, fixed non-wirewound	Plug and socket L.F. connector	Transistor low power amp
Sub group 1 Insp. level IC 6·5% AQL	Dimensions	Dimensions Insertion force Contact holding Contact retention	Dimensions
Sub group 2 Insp. level IC 6·5% AQL	Soldering (resistance to heat) Robustness of term Bump test Climatic sequence to appropriate severity	To be agreed	Temp. cycling Moisture resistance
Sub group 3 Insp. level IC 6·5% AQL	Electrical endurance (duration 2000 hours)	To be agreed	Electrical endurance (duration 2000 hours)

Note: Measurements of reference parameters shall be recorded for CRDS purposes.

Group D Inspection

(To be applied on a sampling basis at long intervals, e.g. 3 years. These tests are the remaining tests which are of a design proving nature necessary to complete and maintain the Qualification Approval of the part. This group might also contain long term endurance tests for information purposes. Failure to pass the tests might cause an investigation of the cause of failure and possibly withdrawal of Qualification Approval.)

	Resistor, fixed non-wirewound	Plug and socket L.F. connector	Transistor low power amp
Insp. level IA based on average lot deliveries 4·0% AQL	Vibration Temp. coeff. Noise Insulation resistance Voltage proof Rapid change of temperature Damp heat (long term)	Vibration Shock Plating proving (as applicable)	Vibration Shock Constant acceleration

Appendix V

Approved Firms Inspection for Common Standard Electronic Parts

Note: The procedure described below is similar to the Ministry of Aviation's Form 6/49 procedure as set out in Av.P.22.)

Application for Approval

1. Firms should state the classes of product which the approval is required to cover.

2. Firms should state any approvals (e.g. MOA (DGI) approval) which they already hold and which will be taken into consideration by the Electronic Parts (Inspection) Committee when deciding whether approval should be given. Likewise, if firms require Government approval they should state whether they already hold approval by the Electronic Parts (Inspection) Committee.

3. Firms approved for the inspection of certain products only may submit an application for an extension of approval in respect of other products of their own manufacture. Similarly, a firm which operates two or more self-contained and independent factories, only one of which is approved, may submit an application for approval of the other factory or factories.

4. Applications for approval are to be made on form .... to the Electronic Parts (Inspection) Committee in duplicate. Copies of form .... are available from ....
....

Requirements for Approval

5. The requirements set out below must be met by a firm seeking approval of its test and inspection arrangements. The term 'Chief Inspector' includes the Head of a Test House or Laboratory where this differs from the Inspection Organization, or where approval is sought by a Test House or Laboratory independent of a manufacturing organization. Likewise the terms 'inspection staff', 'inspection', 'inspection facilities' and 'inspection records' imply any personnel, work, facilities and records used in testing to common standards.

6. Certain general requirements must be met in respect of the following matters:
   (a) Inspection staff.
   (b) Accommodation and equipment.
   (c) Quarantine and bonded stores.
   (d) Inspection records.
   (e) Testing facilities.
   (f) Inspection stamps and other marks of identification.
   (g) Sub-Contract inspection.

These requirements are all necessary to enable the contractor to fulfil the conditions of BSXYZ.

INSPECTION STAFF

7. The inspection organization and staff must be controlled by a Chief Inspector with adequate inspection staff under his control. A deputy to the firm's Chief Inspector, to act for the Chief Inspector in the latter's absence, should also be nominated, unless it is agreed with the Electronic Parts (Inspection) Committee to waive this requirement. In the case of larger firms controlling several factories it is permissible to employ a Group Chief Inspector who is responsible to the Directors for the overall organization of inspection, and who has Factory Chief Inspectors and their deputies under him at each factory.

8. The qualifications and responsibilities of the firm's Chief Inspector are as follows:
   (a) The Chief Inspector and his deputy are to be approved as both technically and administratively qualified to control the inspection of the types of product which the firm will supply.
   (b) If the Chief Inspector or his deputy is changed, the person appointed as his successor is to be similarly approved.
   (c) The Chief Inspector is to be responsible directly to a senior executive of the firm; he is not to be under the control of anyone directly responsible for output.

(d) The Chief Inspector is to be responsible for the competence and continuing efficiency of his inspection staff. He will arrange for effective checks of the efficiency of individual members of his staff, and maintain records of such checks to the satisfaction of the supervising inspector. If the retention of an individual member of the firm's inspection staff is likely to affect adversely the standard of inspection, the Chief Inspector will have the individual removed from inspection duties.

(e) The Chief Inspector is to have access to the actual contract/order documents (or true copies with prices omitted, if desired) and to all patterns, associated specifications, drawings and other relevant documents.

(f) The Chief Inspector has no discretionary power to depart from the specified requirements of the contract.

(g) The functioning of quarantine and bonded stores must be checked at appropriate intervals, and adequate records of such checks maintained by the Chief Inspector, to the satisfaction of the supervising inspector.

(h) The Chief Inspector shall have access to all manufacturing records and records of production changes (see paras. 13–15).

(i) The Chief Inspector is responsible for ensuring the availability of inspection and test schedules for the use of his inspection staff.

(j) The Chief Inspector is responsible for maintaining official inspection instructions (technical and administrative).

(k) The Chief Inspector is responsible for bringing any errors in drawings or other technical documents, and discrepancies, e.g. between specifications, drawings and the contract, to the notice of the appropriate authorities.

(l) The Chief Inspector is responsible for the inspection of packaging if this is included in the contract.

9. The firm's Chief Inspector is thus the principal link between the firm and the Electronic Parts (Inspection) Committee and, subject to the clauses above, it is his sole decision whether or not particular batches may be delivered. The Chief Inspector's duty is to ensure that inspection is both accurate and adequate in all respects. The list of his responsibilities given above is not necessarily exhaustive and may be extended in detailed matters after negotiation and due notice.

ACCOMMODATION AND EQUIPMENT

10. Suitable accommodation and facilities, the extent of which depends on the nature of the work, must be provided both for the firm's inspection staff and for the supervising inspector.

11. Unless otherwise agreed, the firm is to provide such equipment and apparatus as necessary for adequate process control during manufacture, for inspection and testing, and for functional testing (when required) of the products. This equipment may include precision measuring tools, gauges, comparators, etc., the accuracy of which requires to be periodically checked. This checking is to be carried out at the firm's expense (unless otherwise agreed) to the satisfaction of the supervising inspector.

QUARANTINE AND BONDED STORES

12. The provision of suitable stores accommodation for the segregation and easy identification of materials, components, etc., is an essential part of an Approved Firm's inspection facilities in certain industries. When required to do so by the supervising inspector, the firm shall provide Quarantine and/or Bonded Stores. Both Quarantine and Bonded Stores are to be controlled to the satisfaction of the firm's Chief Inspector.

> *A Quarantine Store* is a store in which all supplies are to be held until there is proof of their compliance with specified requirements.
>
> *A Bonded Store* is a store in which only those supplies or products cleared by approved inspection shall be held. The inspection arrangements shall ensure that accepted goods held in bond do not deteriorate in storage; and that no purchased supplies are issued for initial processing, assembly or despatch, except under the control of the Bonded Store.

PROCESS AND INSPECTION RECORDS

13. The manufacturer shall be responsible for ensuring adequate control and recording of all manufacturing processes.

14. The Chief Inspector shall have access to these and any other records which have a bearing on the quality of the product.

15. The Chief Inspector shall be responsible for the adequacy of all inspection records.

TESTING FACILITIES

16. An Approved Firm must either itself provide satisfactory testing facilities or make arrangements for tests to be carried out at an Approved Test House.

In addition:

(a) An Approved Firm shall have such apparatus and/or laboratory facilities as are needed to maintain control of manufacturing processes.

(b) Any necessary testing other than for process control for which the firm is not equipped, is to be carried out at an Approved Test House.

(c) The results of all tests shall be recorded in such a manner that the sample tested and the result obtained can be identified. These records are to be signed by the person responsible for their accuracy, such signature implying that the tests have been carried out in accordance with the requirements of the specification and/or any other governing documents.

(d) All testing equipment and analytical apparatus is to be maintained in a state of accuracy, which is to be verified periodically to the satisfaction of the supervising inspector.

INSPECTION STAMPS AND OTHER MARKS OF IDENTIFICATION

17. All supplies inspected and released by an Approved Firm must bear the impression of an inspection stamp, which identifies both the firm and the individual inspector or examiner responsible. The provision of inspection stamps shall be the responsibility of the firm (see para. 11).

18. The word 'stamp' denotes steel or rubber stamps, stencils, labels or any other device used for the identification of a firm and an individual. When the individual marking of articles is undesirable, the stamp may be impressed on a metal tab or other suitable label affixed to a bundle or container.

19. An inspection stamp which is to be impressed on metal shall be circular or oval in form so as to avoid sharp corners. The design of all inspection stamps is to be submitted for approval and registration.

20. The use of each inspection stamp is to be restricted to the inspector to whom it is allotted.

21. The firm's Chief Inspector is required to maintain a record of the date of issue and withdrawal of inspection stamps. When inspection stamps are withdrawn for any reason, they shall not be replaced by another stamp bearing the same identification marks until at least six months have elapsed since withdrawal, and then only with the concurrence of the supervising inspector. The loss of an inspection stamp is to be recorded without delay to the supervising inspector and the remainder of the stamps under the same code number withdrawn.

22. Viewer's and other markings applied to components are to be distinct from approved inspection stamps.

SUB-CONTRACT INSPECTION

23. In cases where the actions of the sub-contractor are covered by a common standard, the responsibilities of the prime contractor's Chief Inspector shall cover inspection of the sub-contract.

Approval of Stockists

24. Stockists should apply to the Electronic Parts (Inspection) Committee for approval, and each case will be considered on its merits.

25. Used, refurbished, reconditioned, or repaired parts (i.e. anything for which the original approval certificate is no longer applicable) will not be acceptable, without re-certification, under common standard inspection arrangements.

Notification of Approval

26. A manufacturing firm, stockist, or test house, which fulfils all the necessary requirements to the satisfaction of the Electronic Parts (Inspection) Committee will be notified by formal Approval

Letter, and approval will normally take effect from the date of that letter. A firm which receives an extension of a previous approval (see para. 3) will similarly be notified by formal letter. A Certificate of Approval will be issued in due course.

27. Approval will not be granted if it is found that a firm, stockist or test house does not satisfy the relevant requirements.

28. Every Approved Firm, Stockist or Test House is allotted an Approval Number which must be printed on all 'Release Notes', Approval Certificates or Test Reports issued by the Firm, Stockist or Test House. Approval Numbers may also, if desired, be printed on letter headings, advice notes, invoices, etc. The Approval Number, the name and address of the works at which the approved inspection arrangements will operate, and the address of the inspectorate's office which is responsible for supervision will be printed on the List of Approved Firms.

Supervision of Inspection

29. The approval of a firm's inspection arrangements means that all the relevant requirements set out in paras. 5-25 have been met at the time approval is granted. It is the duty of the firm's Chief Inspector to ensure that the conditions of the approval continue to be satisfied. The supervising inspector will exercise supervision to verify that necessary standards are observed.

30. The duty of the supervising inspector is to keep under continuous review an Approved Firm's inspection arrangements. To this end he may institute check inspection or testing at any stage or on any individual inspector's work, as he deems necessary. He will carry out periodic and systematic surveys of the whole field of an Approved Firm's inspection activities, such as its staffing, accommodation, records, test equipment and the availability of contract information, drawings and specifications. If the supervising inspector is not satisfied on any point, whether or not batches have been delivered about which he has any doubt, he will take up the matter immediately with the firm's Chief Inspector and, if necessary, with the Electronic Parts (Inspection) Committee, with the object of restoring satisfactory conditions.

31. Intensified supervision, possibly involving a degree of direct inspection by the Electronic Parts (Inspection) Committee may be required at any time, and particularly:

(a) where there has been a failure of the firm's inspection organization;

(b) where a firm is newly approved;

(c) at the introduction of a new product;

(d) at the introduction of an important modification.

32. When a firm whose inspection department qualifies for common standards approval also has in being or subsequently introduces, a Quality Control Organization not under the control of the firm's nominated Chief Inspector, this Organization shall be subject to the supervision of the Electronic Parts (Inspection) Committee.

SUSPENSION OF SUPERVISION

33. If an Approved Firm has had no work in hand subject to common standards inspection for a period of six months, and enquiries show no prospect of such work's arising in the near future, supervision of the firm will be suspended. Supervision will be resumed when the firm has further orders subject to common standards inspection. The firm must notify the supervising inspector of this fact before manufacture starts.

SUSPENSION OF APPROVAL

34. Suspension of approval is regarded as essentially a temporary measure to be taken when a fault or deficiency can be put right in a reasonable time.

WITHDRAWAL OF APPROVAL

35. Approval will be withdrawn:

(a) at the request of or by agreement with the Approved Firm;

(b) on the grounds of failure to meet the requirements of the Electronic Parts (Inspection) Committee provided always that the position has been put clearly to the Approved Firm in writing and the firm has proved unable or unwilling to put matters right;

(c) after supervision has been suspended for a continuous period of two years under the provision of para. 33.

36. On withdrawal of approval reference to such approval is to be immediately deleted from the firm's documents.

37. Approved Firm's Release Notes are the recognized documents certifying to a consignee that supplies have been inspected before delivery by an electronic parts manufacturer who is an Approved Firm.

38. Each delivery from an electronic parts manufacturer will be covered by a Release Note. The Certificate of Inspection on the Release Note must be signed by the Approved Firm's Chief Inspector or other person responsible to him. All signatories to Release Notes are to be notified to, and approved by, the supervising inspector. Copies of their signatures may be required for record purposes.

39. A model common Release Note is attached (see Appendix VI).

Appendix VI

Serial No. ....

Common Release Note

This copy (No. 1) to Consignee with the goods.
This copy (No. 2) to Consignee's Chief Inspector.
This copy (No. 3) for retention by Consignor's Chief Inspector.

This Release Note is to be used only for electronic parts for which there is a current Qualification Approval and is standard for all approved electronic parts.

Issued under the following Inspection Approval:

Approval No..

Name and Address of Firm...
....
....

To .... Customer's Order No. ....

.... Government Contract No. (where appropriate) ....

Description (with Specification Reference Number)	Quantity	Acceptance Test Report No.	Identification Mark/Serial number (if applicable)	Remarks

Certified that the whole of the supplies detailed hereon have been inspected and tested in accordance with the above Inspection Approval and that they conform in all respects to the specification(s) quoted above and to the requirements of the order.

Date................................ Signed..
for Chief Inspector

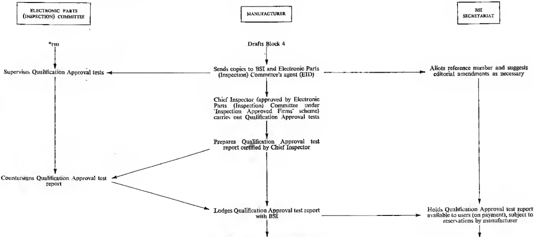
For and on
behalf of..

Inspection
Stamp

Appendix VII

Common Standards for Electronic Parts

Procedure for Preparing and Publishing a Block 4 Specification


ELECTRONIC PARTS (INSPECTION) COMMITTEE
MANUFACTURER
BSI SECRETARIAT
*EID
Drafts Block 4
Supervises Qualification Approval tests
Sends copies to BSI and Electronic Parts (Inspection) Committee's agent (EID)
Allots reference number and suggests editorial amendments as necessary
Chief Inspector (approved by Electronic Parts (Inspection) Committee under 'Inspection Approved Firms' scheme) carries out Qualification Approval tests
Prepares Qualification Approval test report certified by Chief Inspector
Countersigns Qualification Approval test report
Lodges Qualification Approval test report with BSI
Holds Qualification Approval test report available to users (on payment), subject to reservations by manufacturer
Publishes Block 4 and sends copy to BSI (Specification and product available to users)
Notes Qualified Products List

*EID is shown as the agent of the Electronic Parts (Inspection) Committee, but no change in EID's constitutional position under the Crown is implied.

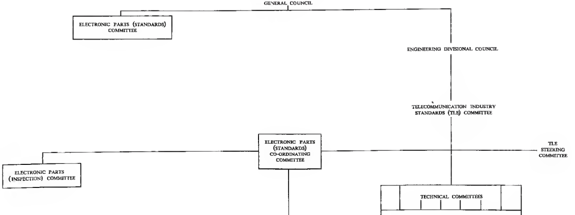
Note: Relevant parts of the Report are:
Paragraphs 26–29: Qualification Approval
41–43: Inspection Authority
60: Preparation and publication of Block 4's
63: Qualified Products List
64: Availability of Documents

Appendix VIII

Common Standards for Electronic Parts

Proposed BSI Organization

(New bodies are ringed)


GENERAL COUNCIL
ELECTRONIC PARTS (STANDARDS) COMMITTEE
ENGINEERING DIVISIONAL COUNCIL
TELECOMMUNICATION INDUSTRY STANDARDS (TLE) COMMITTEE
ELECTRONIC PARTS (STANDARDS) CO-ORDINATING COMMITTEE
TLE STEERING COMMITTEE
ELECTRONIC PARTS (INSPECTION) COMMITTEE
TECHNICAL COMMITTEES
SPECIALIST DRAFTING PANELS

Note: Relevant parts of the Report are:
Paragraphs 41–43. Inspection Authority
66–71: Organization of the BSI

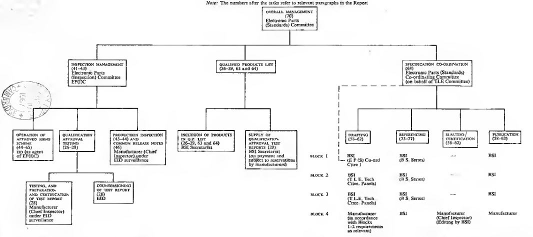
Appendix IX

Common Standards for Electronic Parts

Operational Chart

showing tasks (in block letters) and bodies responsible for them

Note: The numbers after the tasks refer to relevant paragraphs in the Report


OVERALL MANAGEMENT (70) Electronic Parts (Standards) Committee
INSPECTION MANAGEMENT (41–43) Electronic Parts (Inspection) Committee EP(I)C
QUALIFIED PRODUCTS LIST (26–29, 63 and 64)
SPECIFICATION CO-ORDINATION (68) Electronic Parts (Standards) Co-ordinating Committee (on behalf of TLE Committee)
OPERATION OF APPROVED FIRMS SCHEME (44–45) EID (as agent of EP(I)C)
QUALIFICATION APPROVAL TESTING (26–29)
PRODUCTION INSPECTION (43–44) AND COMMON RELEASE NOTES (46) Manufacturer (Chief Inspector) under EID surveillance
TESTING, AND PREPARATION AND CERTIFICATION OF TEST REPORT (28) Manufacturer (Chief Inspector) under EID surveillance
COUNTERSIGNING OF TEST REPORT (28) EID
INCLUSION OF PRODUCTS IN Q.P. LIST (26–29, 63 and 64) BSI Secretariat
SUPPLY OF QUALIFICATION APPROVAL TEST REPORTS (29) BSI Secretariat (on payment and subject to reservations by manufacturers)

	DRAFTING (58–62)	REFERENCING (73–77)	SCRUTINY/ CERTIFICATION (58–62)	PUBLICATION (58–62)
BLOCK 1	BSI (E P (S) Co-ord Cttee)	BSI (B S. Series)	—	BSI
BLOCK 2	BSI (T L E. Tech Cttee. Panels)	BSI (B S. Series)	—	BSI
BLOCK 3	BSI (T L.E. Tech Cttee. Panels)	BSI (B S. Series)	—	BSI
BLOCK 4	Manufacturer (in accordance with Blocks 1–2 requirements as relevant)	BSI	Manufacturer (Chief Inspector) (Editing by BSI)	Manufacturer
BLOCK 5 (CRDS)	Manufacturer (in accordance with Block 2 requirements)	Manufacturer	Manufacturer (Chief Inspector)	Manufacturer (to H M G. and commercial customers on request or through normal trade channels)

Note: EID is shown as the agent of the Electronic Parts (Inspection) Committee, but no change in EID's constitutional position under the Crown is implied.

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Ministry of Technology

Second Report of the Committee on Common Standards for Electronic Parts

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In February, 1967 functions previously performed by the Ministry of Aviation were transferred to the Ministry of Technology, which had previously become the Government Department responsible for the implementation of the recommendations of the Burghard Committee on Common Standards for Electronic Parts

Note by Ministry of Technology

The recommendations made by the Burghard Committee on Common Standards for Electronic Parts suggest a major change in established procedures for the specification, manufacture, inspection and certification approval of electronic parts.

In view of the wide ramifications of the proposals, detailed discussions were held between the Government departments concerned and representatives of the electronic parts manufacturing industry, industrial and commercial users, and the British Standards Institution (B.S.I.). These discussions resulted in general agreement and on 28th March, 1966, the Ministry of Aviation, on behalf of H.M. Government, wrote to the Conference of the Electronics Industry stating formally that the Burghard Committee recommendations were accepted and that action would be taken by all interested Government departments and the British Standards Institution to implement the recommendations. The consequence of the new system will be the gradual replacement of a number of Defence (DEF) and electronic valve and semi-conductor diode (CV) specifications and existing British Standards.

In April, 1966 the British Standards Institution was formally requested to assume the duties and responsibilities envisaged in the Report. This involves the Institution in general management of the scheme, establishment and control of the inspection and approval arrangements and the preparation of the various specifications required, paying particular attention to the recommendation that the U.K. Common Standards should conform with International Electrotechnical Commission (I.E.C.) recommendations whenever possible. The specifications are being prepared by the various existing technical committees but to assist with the other functions, the British Standards Institution has established three committees, on which industry, users and Government departments are represented:

OC/33 MANAGEMENT COMMITTEE

This Committee, referred to in the Report as the Electronic Parts (Standards) Committee, is responsible for supervising the implementation of the scheme and for dealing with matters of overall policy.

OC/1/53 INSPECTION COMMITTEE

This Committee, referred to in the Report as the Electronic Parts (Inspection) Committee, is responsible for organizing and overseeing the inspection and certification approval arrangements established under the scheme.

TLE/-/2 CO-ORDINATING COMMITTEE

This Committee, referred to in the Report as the Electronic Parts (Standards) Co-ordinating Committee, is responsible for drafting the basic specification 'General Requirements for Electronic Parts of Assessed Quality' and for ensuring that all subsequent specifications prepared under the scheme are correctly formulated. The resulting form of the specification may differ considerably from that indicated in the Report; this applies particularly to Appendix IV which is by way of explanation only.

Both H.M. Government and the U.K. electronics industry attach great importance to the establishment of international standards and consider that the principles set out in the Burghard Committee report form the basis for an international system for common specifications, and mutually accepted arrangements for inspection and the provision of reliability data for electronic parts.

The many advantages offered by the Burghard scheme should be of mutual benefit to other countries in Europe and elsewhere, and the Government, industry and the British Standards Institution have undertaken to make these advantages more widely known and actively to encourage other countries to participate in the scheme.

It is recognized that, in this event, some modification of the detailed arrangements for implementation of this concept will be necessary to achieve agreement.

MINISTRY OF TECHNOLOGY
Millbank Tower
London, S.W.1

9th March, 1967

Second Report of the Committee on Common Standards for Electronic Parts

Summary

1. The Committee set up by the Permanent Secretary of the Ministry of Aviation in 1963 under the chairmanship of Rear Admiral G. F. Burghard, C.B., D.S.O., is satisfied that substantial benefits would result from a system of common standards for electronic parts for military and industrial use, and it recommends that the British Standards Institution should be invited to introduce such a system.

2. The Committee has devised in outline a system of common standards which it considers would meet the varying requirements of users. It envisages that specifications would be prepared by the BSI.

3. Specifications for parts would include, in addition to normal acceptance and sampling tests (physical, mechanical and environmental), the requirement to carry out life tests. All the test results would be accumulated over six-monthly periods and made available by the manufacturers of the parts in 'Certified Reliability Data Sheets'.

4. The system would provide for sole manufacturers of particular parts to write and publish specifications for them—in conformity with requirements laid down in the basic standards common to the family of parts.

5. A system of inspection by the manufacturer's inspectors should be established under the supervision of an executive agent of the BSI. This agent should be the Electrical Inspection Directorate of the Ministry of Aviation.

6. Before supplying parts to common standards, manufacturers would be required to undertake tests (under the supervision of the BSI's executive agent) to establish Qualification Approval. The parts would then be included in a Qualified Products List. Deliveries would be made against common Release Notes.

7. Common standards for parts in which there was a military interest would include NATO Stock Numbers.

8. Common standards would supersede present military DEF and CV specifications and some British Standards.

9. The BSI's organization would need to be strengthened.

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